

## **APPENDIX J**

### **DETAILED OPERATIONS FOR PROPOSED ACTION**

## **Proposed Operation Of The South Dade Conveyance System and WCA-3A Under the Interim Structural and Operational Plan for 2001 / Interim Operating Plan for 2002 – 2003**

**Introduction:** The purpose of this appendix is to define the operations to implement the Interim Structural and Operational Plan for 2001 (ISOP 2001) / Interim Operational Plan (IOP) For Hydrologic Compliance with the Cape Sable Seaside Sparrow Biological Opinion for the Year 2001, 2002, and 2003 and will be superseded by operations under the Modified Water Deliveries Project. These operations will be used in place of the operating criteria contained in Appendix D of the March 2000 Environmental Assessment for the Interim Structural and Operational Plan (ISOP). The US Army Corps of Engineers (Corps) has used the best available technical information based on the calibrated and peer reviewed South Florida Water Management Model (SFWMM) and as requested by the Presidents Council on Environmental Quality (CEQ) proceeded with the completion of the ISOP 2001/IOP.

The March 2000 EA defined the emergency deviation from the water control plan, which the Corps believes has provided the best opportunity to meet the needs of the sparrow during the 2000-nesting season. The ISOP 2000, as detailed in the EA, stated that “operations could be modified by further modeling and/or testing and monitoring through coordination with the FWS and others as deemed appropriate”. The ongoing modeling effort led to the development of a modeling run, ISOP 9d which most closely met the Reasonable and Prudent Alternative (RPA) as outlined in the Final Biological Opinion (BO) issued on 19 February 1999 by the U.S. Fish and Wildlife Service (FWS), while meeting the other authorized purposes of the Central and Southern Florida Project (C&SF). The EA included general criteria for operating the temporary pump station, S-332B, and final criteria was provided to the South Florida Water Management District (SFWMD) in a letter dated December 21, 2000.

In addition to the 2000-nesting season, the ISOP was developed to meet the non-nesting season requirements of the FWS BO until the IOP was developed and the Environmental Impact Statement (EIS) was complete. Due to unforeseen delays, ongoing modeling and interagency discussion, the IOP was not completed in time to begin operational changes for the 2001 nesting season; consequently, the Corps has developed ISOP 2001 operations, which would be the basis of the IOP. ISOP 2001/ IOP is based on modeling run ISOP-9dbR. ISOP-9dbR removed the temporary deviation to the Water Conservation Area 2A (WCA-2A) schedule and modified the deviation to the WCA-3A regulation schedule. During the next several years, these operating criteria may be adjusted to reflect changes needed to better meet the conditions of the BO as well as address flood control in the system. Information on hydrologic modeling of the ISOP 2001 / IOP is contained in Appendix H and details the ongoing effort to optimize operations to meet the requirements of the BO.

The BO contains a RPA which the FWS believes will result in improved conditions for the CSSS and stipulates that the Corps is required to begin operations in the SDCS which would produce hydroperiods and water levels in the vicinity of Cape Sable seaside sparrow subpopulations C, E and F, equal to or greater than those that would be produced by implementing the exact provisions of Test 7, Phase II as described in the Final EA for Test 7 (Corps 1995). Test 7 Phase II defined certain headwater and tailwater elevations; however, modeling for the ISOP 2001/IOP has been done to define equivalent hydroperiods and water levels. The modeling also defines the

hydrologic equivalent of passing 30%, 45%, and 60% of the regulatory releases from WCA-3A to Northeast Shark River Slough (NESRS) through 2001, 2002, and 2003.

Prior to implementation of the ISOP, in December 1999, Structures in the South Dade Conveyance System (SDCS) under Test 7 Phase I were operated based on headwater and tailwater elevations. Operations under the ISOP 2001/IOP focus on achieving the hydrologic equivalent of Test 7 Phase II and percentage of the regulatory releases from WCA-3A to NESRS by pumping water westward toward ENP. The ISOP 2001/IOP will use an operational scheme similar to a "regulation schedule". A regulation schedule varies the timing and quantity of water based on the time of year. The operations for the SDCS would seek to lower canal levels during the wet season and allow for higher water levels during the dry season. The plan relies heavily on the operation of pump stations S-331, S-332D and the temporary pump station S-332B, completed in April 2000. The plan may include the construction of the other pump stations as proposed under the Modified Water Deliveries Project (MWD) and the C-111 project. Subsequent modeling would be to evaluate any additional structural modifications. The plan will seek to maintain the authorized level of flood protection while meeting the requirements of the BO.

#### **Lake Okeechobee, Water Conservation Area (WCA) 1, WCA-2A, and WCA-3A:**

Lake Okeechobee: Operations will follow the WSE (Water Supply/Environmental) regulation schedule, approved on July 7, 2000; however, regulatory releases to the Water Conservation Area may need to be modified during the sparrow nesting season. FWS has defined the nesting season as beginning March 1 and ending July 15, or ending before July 15 if water levels have been at acceptable levels for an acceptable period of time, for example 60 consecutive days below 6.0 ft-NGVD for sub-population A. Some operations associated with the ISOP 2001/IOP require changes prior to the start March 1 start of the nesting season. If releases from Lake Okeechobee are necessary during the sparrow nesting season, releases south to the WCA's should only be made to WCA-1 if it is below regulation schedule and if the water can be moved out of WCA-1 through coastal canals, held in WCA-1. If the S-10 structures are open, Lake Okeechobee regulatory releases should not be made to WCA-1 unless WCA-2A stage is below regulation schedule. If the S-11 structures are open, Lake Okeechobee regulatory releases should not be made to WCA-2A unless WCA-3A is in Zone E, or the requirements for sub-population A have been met, or it has been determined that requirements for sub-population A cannot be met or that releases from the S-11 structures would have no negative effects on sub-population A. Lake Okeechobee releases should not be made to WCA-3A, unless WCA 3A is in Zone E, or the requirements for sub-population A have been met, or it has been determined that requirements for sub-population A cannot be met or that releases from the Lake would have no negative effects on sub-population A. Once the nesting season for sparrow sub-population A is complete, the normal regulation schedule operation for releases to the WCA's will be resumed. Releases to meet water supply requirements will not change due to ISOP 2001/IOP but may be modified as needed in the case of a regional drought.

WCA-1: WCA-1 Operations will follow the regulation schedule approved in March 1995 except during the nesting season, when the following changes will be made: If the WCA-1 stages are above regulation schedule during the nesting season, then make releases to tide via coastal canals

if capacity is available. When possible, during the nesting season, the S-10 structures will only be used when WCA-2A is below regulation schedule. At this time a temporary deviation to the regulation schedule for WCA-1 is not required. Releases to meet water supply requirements will not change due to ISOP 2001/IOP but may be modified as needed in the case of a regional drought.

WCA-2A: Currently, WCA-2A is managed under an 11.0 to 13.0 feet, NGVD, regulation schedule developed by the SFWMD Environmental Sciences Division and implemented in 1989. During the past several years, in an effort to lessen potential impacts on WCA-3A and ultimately the emergency operations for the sparrow, a temporary deviation to the WCA-2A regulation schedule was implemented, see the March 2000 ISOP EA. The Fish and Wildlife Conservation Commission (FWCC) expressed concern regarding the use of the temporary deviation that holds higher water levels in WCA-2A. In response to their concerns, additional modeling was done as a part of ISOP 2001/IOP, and has indicated that a temporary deviation for WCA-2A will not be required for the ISOP 2001 or possibly for subsequent years of the IOP. In January 2001, the Corps received a request from the SFWMD to evaluate and coordinate a temporary deviation that will allow water from WCA-2A to be used for water supply to the Everglades Agricultural Area via S-7 when water is 0.5 feet-NGVD above the 11.0 to 13.0 feet, NGVD schedule. Upon approval from the Corps' South Atlantic Division, this deviation would be in effect through July 23, 2001 or until such time as the water use restrictions are rescinded for the Lake Okeechobee Service area. Releases to meet water supply requirements will not change due to ISOP 2001/IOP but may be modified as needed in the case of a regional drought.

WCA-3A: Operations will follow the temporary deviation to the normal WCA-3A regulation schedule, figure D2 and supplemental zone information table D3. The temporary deviation to the normal WCA-3A regulation schedules allows for early closure of the S-343A & B, S-344, and S-12 structures. The temporary deviation also includes a lower Zone E1, which is designed to minimize releases from WCA-3A that could adversely impact sub-population A in advance of and during the nesting season and maximize releases via the remaining outlets and away from sub-population A. The temporary deviation closes S-343A, S-343B, and S-344 from November 1 through July 15, or until the requirements for sub-population A have been met or it has been determined that requirements for sub-population A cannot be met and releases from these structures are necessary to reduce flood risks in WCA-3A. S-12A is closed on November 1, S-12B is closed on January 1, S-12C is closed on February 1 and S-12D remains open all year as necessary to meet WCA-3A discharge requirements. During the nesting season, releases via S-142, S-151, and S-333 are maximized when WCA-3A is above Zone E, and downstream conditions permit. Zone E1 has been designed to allow tree islands to dry out and recover from stress associated with high water that may have occurred due to the early closing of the S-343's, S-344, and S-12A, B and C structures. In addition, the Zone E1 is an attempt to provided a buffer against the necessity to make releases via the S-12's and maximize the nesting period for sub-population A. During periods of regional drought, operations in Zone E1 may be evaluated and/ or modified to maximize the prudent use of water supply for the C&SF project. Zone E1 does not preclude releases from Lake Okeechobee or the S-11 structures so long as those releases could not be linked to problems associated with meeting the RPA requirements for the CSSS including eastern populations, such as releases necessary to maintain the L-67A borrow canal levels above 7.5 ft when making releases via S-333. Releases to meet water supply requirements

will not change due to ISOP 2001/IOP but may be modified as needed in the case of a regional drought.

#### **ENP/South Dade Conveyance System (SDCS)**

During storm events and pre-storm preparations, water levels may be lowered further and longer than provided for during the Experimental Program. Water supply water supply requirements will not change due to ISOP 2001/IOP but may be modified as needed in the case of a regional drought.

South Dade Conveyance System / L-31N, L-31W operations during use of S-151 and/or S-333 /

S-334 to move water from WCA-3A has the operational goal of maximizing the discharge of water from WCA-3A and away from the western habitat of the sparrow via the SDCS to Northeast Shark Slough, Taylor Slough, and the Southern Everglades without adversely impacting private property. The following specific operational instructions represent modeling that has been done and that is ongoing to define operations for structures that will produce the hydrologic equivalent to implementing Test 7, Phase II and to passing the 30%, 45%, and 60% of the regulatory water releases from WCA-3A to Northeast Shark River Slough.

S-151, S-31, S-337, S-335: These structures may be used to move storage water from WCA-3A as downstream capacity is available. These operations would not take place in Zone E of the WCA-3A regulation schedule unless using structures for water supply deliveries. S-335 will not be used when the downstream water levels are 6.0 ft-NGVD or greater. The design optimum for S-335 headwater is 6.0 ft-NGVD, and operations are made in an effort not to exceed the design optimum, however, there are times when higher water levels may occur. Once the downstream water levels are 6.0 ft-NGVD or less, then S-335 may be opened with the goal of achieving a 6.0 ft-NGVD headwater upstream of S-335 before water is introduced to the SDCS via S-334. The 6.0 ft-NGVD or less is an indication that capacity is available in the SDCS.

S-333 and S-355 A & B: These structures which discharge to L-29 borrow canal and may be used in conjunction with one another. The design capacity for S-333 is 1350 cfs. If conditions warrant, sparrow nesting, rainfall, etc., then the stage in L-29 as measured at the S-333 tailwater may go up to 9.0 ft-NGVD. A water level of 9.0 ft-NGVD in L-29 canal may cause some impacts to Tamiami Trail. See the section at the end of this appendix for operations of S-333 when WCA-3A is in Zone E1. The criteria for use of S-333 based on the downstream trigger well, G-3273, is as follows:

When G-3273 is above 6.8 ft-NGVD there will be no net discharge to NESRS. Only the amount of water that can be discharged from S-333 to the L-29 canal and through S-334 to L-31N so long as S-332D and or S-332B are operational and subject to a tailwater between 5.5 and 6.0 ft-NGVD at S-334.

When G-3273 trigger well is below 6.8 ft-NGVD then pass up to the maximum design capacity at S-333 of 1350 cfs. S-334 may also be used during this time to reduce high stages in L-29 when downstream capacity is available.

S-334: Can be used in combination with S-333 to move water from WCA-3A. If moving water for WCA-3A operations, maintain S-334 TW between 5.5 and 6.0 ft-NGVD.

S-336: When S-334 is closed, make maximum possible discharges when permitted by downstream capacity.

G-211: Operate the gates as necessary at G-211 to maintain the upstream stage between 5.5 and 6.0 feet. When Angel's well is above 5.5 ft-NGVD, then reduce G-211 gate opening if necessary to follow the Angel's well criteria at the headwater of S-331 while maintaining the upstream stages. When Angel's well is below 5.5 ft, there is flexibility in the gate opening at G-211. Note that G-211 is a manually operated structure with long response times and time-consuming operations. As a result, frequent gate operations at this structure are impracticable, and stages outside this range may occur for several days. The goal is to keep stages generally between 5.5 and 6.0 ft-NGVD upstream of the structure, insofar as practicable. It is recognized that, during flood control operations, or when making water supply deliveries, or when moving water for WCA-3A operations, stages outside this range, either high or low, may occur for extended period of time. G-211 would open when the headwater stage exceeds 6.0 ft and close when the headwater stage drops to 5.5 ft

S-338: Make maximum possible discharges when permitted by downstream capacity; however, S-338 is a manually operated structure, so excessive gate operations must be avoided. The goal is to keep stages upstream of the structure as high as practical (see the section above on S-151. S-338 would normally be closed, but would be opened when the headwater at G-211 is exceeds 5.8 ft-NGVD. S-338 would be closed when the headwater stage at G-211 is expected to remain at or below 5.5 ft-NGVD. It is recognized that, during flood control operations, or when making water supply deliveries, or when moving water for WCA-3A operations, stages outside this range, either high or low, may occur for extended period of time.

S-331: Up to 24-hour pump operation and up to three pumps may be used when S-332D and or S-332B are in operation. S-331 HW should not be drawdown below 3.5 ft-NGVD and the S-331 TW should not exceed 5.5 ft-NGVD, although water levels outside of this range may occur. Operate as per the Angel's well as follows, except when it may be necessary to hold water levels lower than specified in the Angel's well criteria in order to utilize the full available pump capacity at S-331:

- When Angel's well is below 5.5 ft, there is flexibility in the operation of S-331
- If the level at Angel's well is between 5.5 and 6.0 ft, the average daily water level upstream of S-331 would be maintained between 5.0 and 4.5 ft if permitted by downstream conditions.
- If the level at Angel's well is above 6.0 ft, the average daily water level upstream of S-331 would be maintained between 4.5 and 4.0 ft until the water level at Angel's well recedes below 5.7 ft, if permitted by downstream conditions.

S-194 and S-196: During operations which move water from WCA-3A, or as necessary for flood control operations, make maximum possible discharges when permitted by downstream capacity.

S-332B: S-332B is a temporary 575 cfs pump station and 167 acre detention area that lies within footprint of C-111 permanent pump station and detention area. There are four 125 cfs diesel pumps and one 75 cfs electric pump connected by a half mile of pipe to the detention area. The 75cfs electric pump was intended for seepage and hydration with no diesel backup, and may not be available for flood control operations. The station is operated by the SFWMD at the request of the Corps. The structure may be operated manually or via telemetry. The use of S-332B will allow re-hydrating eastern sparrow areas. The goal is to operate S-332B as defined by the hydrologic modeling, which may mean that during certain periods of the year, the total pump discharge may be limited to something less than 500 cfs. The use of S-332B during the IOP is in lieu of the 30%, 45%, and 60% to NESRS criteria and Test 7, phase II canal stages.

S-332D: This pump station is operating on a Department of Environmental Protection (DEP) Emergency Order #99-2242, issued on December 30, 1999, and subsequently extended to allow the use of S-332D under the provisions of the ISOP 2001/IOP. Modeling indicated that S-332D may discharge up to 500 cfs from the end of sparrow nesting season until the end of January, using 4.5 ft on and 4.0 ft off criteria. Beginning on February 1 through the end of the nesting season, limit pumping 165 cfs, using 5.0 ft on and 4.8 ft off criteria.

L-31W, S-174/S-332D, S-332, and S-175: During ISOP 2001/IOP operations, suspend the use of the weekly computed target stage in L-31W. Turn S-332D on as stated in the S-332D section above. Operate S-174 / S-332D to maintain L-31W stage measured at S-175 HW gage no less than 3.0 ft-NGVD, with not upper limit. S-332 and S-175 will not be used.

S-176: Open as necessary to maintain S-332D HW criteria as specified above. S-176 will also open to make S-18C minimum deliveries once conditions become dry. S-176 would be used in combination with S-332D to control canal stages between S-331 and S-176. During the nesting season, the open criteria is 4.85 ft-NGVD and the close criteria is 4.65 ft-NGVD. During non-nesting season operations, the open criteria is 4.7 ft-NGVD and the close criteria is 4.2 ft-NGVD

S-177: The ISOP/IOP operating range is 3.6 to 4.2 ft-NGVD.

S-18C: The ISOP/IOP operating range is 2.0 to 2.25 ft-NGVD.

S-197: This structure will remain closed unless triggered to open due to rain event using the operating criteria as follows: Open 3 gates if S177 open and S177 > 4.1 ft or S18C > 2.8 ft. Open 7 gates if S177 > 4.2 ft or S18C > 3.1 ft. Open 13 gates if S177 > 4.3 ft or S18C > 3.3 ft. Close

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when all following conditions are met:: 1) S-176<5.2 and S-177<4.2, 2) Storm moved away from basin, and 3) after 1 and 2 are met, keep the number of S-197 culverts open necessary only to match residual flow through S-176. All culverts closed if S-177<4.1 after all conditions satisfied.

Note that operational criteria may be adjusted to reflect changes needed to better meet the conditions of the Biological Opinion as well as address flood control in the system.

### S-333 Discharges in Zone E1

During the spring recession, when making discharges via S-333, the L-67A borrow canal recession rate, measured at the S-333 headwater, can reach a point where it is much greater than the marsh recession rate. It appears that canal stages can drop much quicker than marsh stages when the headwater at S-333 drops below 8.25 ft-NGVD with the scatter in data becoming even greater below 8.0 ft-NGVD. Above 8.25 ft-NGVD at the S-333 headwater, there is approximately a one-to-one relationship between marsh and L-67A canal stages. Below 8.0 ft-NGVD, the relationship can be as much as five-to-one, based on data plotted in figures D3 – D6. By looking at Figures D3 – D6, one notices the scatter in the data below approximately 8.25 ft-NGVD. The data falling below the extension of the upper trendline is of significance to operations. The data indicates that it becomes more difficult to get water out of the marsh when water levels fall to certain elevations. The geology of the area plays a major role in the movement of water from the marsh to the canal. In the following figures, data falling along the extension of the upper trendline is representative of the ability of operations to perform a natural recession of the canal and marsh together. In figure D3 the data shows that with a 6.5 ft headwater at S-333, marsh stages at Site 65 could range from approximately 6.5 ft to nearly 8.0 ft. If the marsh is closer to 6.5 ft when the canal is 6.5 ft, then the operations lead to a more natural recession. If the marsh is 8.0 ft when the canal is at 6.5 ft, then operations have drawn down the canal at a higher rate than the water can move from the marsh to the canal. Based on

the graphics below the following operations are proposed.

#### Recommendations for Operations in Zone E1:

When the L-67A canal stage, measured at the S-333 headwater (S-333 HW), is in Zone E1, operations should be modified based on the canal-marsh relationship described in this section. Note that during very dry periods, when water levels are in Zone E of the WCA-3A regulation schedule, it may not be possible to maintain canal stages, even when water is supplied from another source for water supply deliveries to the SDCS.

Table D2

WCA-3A Zone E1 / E1a Proposed Operations	
S-333 HW > 8.25	Make maximum practicable releases as required under ISOP 2001 or IOP operations.
8.25 > S-333 HW > 8.0	Reduce discharges via S-333 or supply water from another source to maintain the headwater between 8.25 and 8.0 ft-NGVD.
8.0 > S-333 HW > 7.5	Reduce discharges via S-333. At these canal stages, it is permissible to supply water from WCA-2A if WCA-2A is above the 2A regulation. The S-333 hw should not be drawn down below 7.5 ft when making water supply deliveries,



31W, and C-111 canal system and control structures. Currently, for the East Coast Canal System, the canal system and control structures to the east of L-31N, the South Florida Water Management District (SFWMD) implements canal drawdown operations based on impending rainfall events. The goal for the SDCS is to develop a similar set of canal drawdown operating criteria which seek to balance the needs of the natural system with the authorized purposes of the Central and Southern Florida (C&SF) Project, which is multipurpose in scope and includes flood control and water supply.

The hurricane season is from June through November. When there are tropical depressions, tropical storms, and/or hurricanes in the Atlantic Basin, the National Hurricane Center (NHC) will issue tropical cyclone public advisories, forecast advisories, forecast discussions, and strike probability forecasts\* every 6 hours.

\* [For the period 1989-1998, the average location error by forecast period was 55 statute miles at 12 hours, 102 miles at 24 hours, 147 miles at 36 hours, 164 miles at 48 hours and 278 miles at 72 hours. The strike probability forecast indicate the statistical chance that the tropical cyclone center will pass within 75 statute miles of a specified location within 3 days of the initial forecast time. The maximum strike forecast probabilities are 10-15% at 72 hours, 20-25% at 48 hours, 25-35% at 36 hours, 40-50% at 24 hours, and 75-85% at 12 hours.]

The SFWMD employs meteorologists who evaluate each tropical event and prepare average forecast errors using NHC forecast tracking maps. The average forecast error means when the Hydrometeorologic Prediction Center (HPC) or NHC has forecasted a specific track and the cyclone could end up anywhere in that "swath" within the next 72 hours with around a 60% confidence level. The average forecast error swath is based on the 10-year average of forecast errors.

In addition to the Hurricane season, South Florida is also affected by non-tropical cyclone storms. These non-tropical cyclone storms generally fall into the category of stationary fronts, upper level lows and sub-tropical cyclones. For non-tropical or sub-tropical cyclone events the SFWMD meteorologist's quantitative precipitation forecast (QPF) will be used such that when the 3-day QPF forecast is for 4 or more inches of rain then pre-storm preparations will begin.

The SFWMD Operations Control Division has defined operational procedures to be implemented depending on the timing or amount of advance warning prior to the onset of tropical storm force winds. The Corps of Engineers also has defined in the Master Water Control Manual for each part of the Central and Southern Florida Project (C&SF) a water control plan with instructions for pre-storm operations for structures around Lake Okeechobee and the Water Conservation Areas. The SFWMD operational procedure are termed "Conditions", the specific operating procedures for these conditions will be described in further detail in this document. Conditions are briefly summarized as follows:

- Condition 4, 72 – 48 hours prior to the impact of tropical storm force winds, is earliest level of preparation when the system is evaluated and initial adjustments made to operations depending on the forecast and nature of the storm. Coordinate with the Corps of Engineers and local drainage districts

- Condition 3, 48 – 24 hours prior to the impact of tropical storm force winds, continue pre-storm operations and coordination with the Corps of Engineers and local drainage districts.
- Condition 2, 24 – 12 hours prior to the impact of tropical storm force winds, bring telemetry-controlled sites to final pre-storm configuration, establish alternate emergency control station if necessary.

The remaining levels of preparation are Condition 1, 12 – 0 hours prior to the impact of tropical storm force winds; During the event; and Recovery after the event. It is important to note that some storm events do not allow for the full condition 4 with even 48 hours of advance warning.

It is important to emphasize that the Central and Southern Florida Project is multi-purpose in design, and that pre-storm operations may not prevent flooding, such as experienced after Hurricane Irene in October 1999 or in October 2000. The condition of the groundwater system at the time of a storm event is a significant and is highly dependent of the amount and extent of rainfall that has already occurred prior to subsequent events. Further, there are areas of Dade County, and South Florida in general, which are at low elevations and for which no amount of drawdown can prevent flooding depending on the amount and extent of the event. The water levels discussed in this document are target levels and may not be attainable.

During the Cape Sable seaside sparrow nesting season, March 1 through July 15, or until nesting success, as defined in the Fish and Wildlife Service February 19, 1999 Final Biological Opinion, has been met, pumping at S-332D and S-332 is limited to 165 cfs. This constraint on pumping may limit the ability to implement pre-storm operations. Additional modeling may be required to fully determine possible impacts to sparrow nesting on implementing pre-storm operations.

### **Notification and Briefing Process**

The Executive level of the SFWMD and the Corps of Engineers, will be briefed prior to initiation of pre-storm operations. This may occur prior to 72 hours or as soon as the average error forecast swath shows South Florida to be likely to be in the path of a storm, or the SFWMD 3-day quantitative precipitation forecast (QPF) over Dade County is 4 inches or higher. Obtaining Executive level approval is important in order to demonstrate to interested parties, such as the Fish and Wildlife Service and the National Park Service, that operations were not arbitrary or capricious and that possible impacts to the sparrow or to the natural system were considered; however, in order to maintain the multi-purpose functioning of the C&SF project, flood control operations were necessary.

#### **1. Conditions 4 and 3 (24 to 72 Hours Prior to Storm Conditions)**

Based on the Executive level orders, up to 72 hours in advance of a storm.

##### **Drawdown Implementation:**

Between 24 and 72 hours before predicted storm conditions in Miami-Dade, the following target water levels are set for the SDCS. The initiation of the pre-storm drawdown criteria would be triggered when Dade County is within the average error forecast swath as developed by the NHC, or when the SFWMD 3-day quantitative precipitation forecast (QPF) over Dade County is 4 inches or higher. These pre-storm drawdown levels are not less than the level at which water supply deliveries are made during dry periods, that is 1.5 ft below optimum canal levels, except

the reach north of G-211, which is 1.0 ft below current, normal operating levels. These levels are target levels and may not be attainable.

Table 1.

Canal	Reach	Target Level for Prestorm Draw-Down (ft)
L-31N	G-211 to S-331	4.0*
L-31N	S-331 to S-176	4.0
L-31W	S-174 to S-175	No target
C-111	S-176 to S-177	3.0
C-111	S-177 to S-18C	2.0
C-111	S-18C to S-197	No change**

\*If Angel's well is 5.5 ft-NGVD or below, then 4.0 would be the target, otherwise, 3.5 ft-NGVD at the headwater of S-331 will be the target.

\*\*Operation as specified in the SFWMD structure book for S-197

### Sequence for Achieving Target Levels

In an effort to achieve the target levels, the following sequence of operations is recommended:

Table 3. Temporary Pump Station S-332B Operations

<b>Rising Water Level (ft)</b>	<b>Discharge (cfs)</b>	<b>Falling Water Level (ft)</b>	<b>Rated Discharge (cfs)</b>
4.7	75*	5.0	450
4.9	200**	4.9	325
5.0	325	4.8	200**
5.1	450	4.7	75*
5.2	575	4.2	0

\* Start with 125-cfs pump if 75-cfs pump is not operational

\*\* This will cause overflow of the weir in the retention area

During pre-storm operations, the criteria for operation of S-332B would be the same as under normal operations, however, the notification procedure is to take place prior to changes in the upstream or downstream structural operations that might cause an increase in pumping and subsequent overflow of the weir. Refer to the notification and briefing process section of this document regarding briefing the Executive level prior to initiating pre-storm operations.

#### **S-197**

No change is suggested in the operational criteria for this structure during Condition 4. The operational criteria is defined the SFWMD structure book for S-197.

#### **2. Condition 2 and 1 (12 to 24 Hours Prior to Forecast arrival of tropical storm force winds).**

During Condition 4, 12 to 24 hours prior to the following considerations:

**3. Recovery (Conditions immediately after the storm ends or if the storm forecast changes such that Dade County is no longer likely to be affected.)**

Operations during Recovery consist of: 1) Maximizing discharges at water control structures to minimize flooding and 2) make the transition back to operational regime in place prior to the storm.

Operations may also be returned to levels prior to implementing pre-storm operations as soon as the Dade County is no longer within the average forecast error swath or when the SFWMD 3-day total aerial average quantitative precipitation forecast over Dade County is less than 4 inches.

**Plan for Worst Case:** Recovery would be necessary if storm conditions result in significant rainfall in the south Miami-Dade area. The target for operations would be to return to operational regime in place prior to the storm. However, use of water control structures (e.g., S-175, S-332B) under emergency flood control mode would begin or continue until Recovery is complete. The following operations (Table 5) are suggested to continue to operate in emergency flood control mode:

Table 5.

Structure	Status
S-331	Pump when downstream conditions allow
S-332D	Continue to pump
S-175	Open depending on conditions
S-197	Open depending on conditions
S-332B	Resume pumping according to proposed operational criteria, weir may overflow

**Sequence for Achieving Normal Operating Ranges**

It is not possible to describe the sequence of operational actions during Recovery, prior to a particular storm event. The sequence of operational actions will depend largely on the rainfall distribution and rainfall amounts resulting from the storm.

**4. Back to Normal Mode (Operational regime in place prior to the storm, currently ISOP)**

The following conditions must be met before ceasing emergency flood control mode and resuming normal mode:

1. Stages in canal reaches must be within the specified operating ranges in place prior to the change to pre-storm or storm operations.
2. Duration of flooding impacts has been reduced. Flooding impacts are defined as those resulting from standing surface water affecting residential areas or high groundwater affecting agriculture.
3. The flood control system must be well positioned to deal with subsequent storms

Once these conditions are met, the normal mode, as defined by operational regime in place prior to the storm, currently ISOP, may be resumed. Emergency use of certain water control structures, such as S-175 and S-332B, would cease.

The pre-storm/storm portion of this appendix may be modified depending on additional information, as it becomes available.

**WCA-3A Regulation Schedule Zones for ISOP 2001**

ZONE	S-12	S-333	S-151	S-343A&B, S-344
<b>Zone A</b>	Open full when permitted subject to conditions of note 1 below  Zone A is the flood storage pool for WCA-3A, water levels may require the opening of S-12C, S-12B, and/or S-12A during the period 1 Nov – 15 July to avoid an unacceptable risk of failure of WCA-3A levees and structures.	See note 2 and 3 below. Make maximum allowable discharge subject to downstream conditions.	See note 3 below. Maximum allowable discharge when WCA-3B stage is below 8.5 ft-NGVD.	No discharges from 1 Nov – 15 Jul, unless the FWS has determined that nesting for the CSSS sub-population A has ended. If non-nesting season, then make maximum allowable discharges if downstream conditions permit.
<b>Zone B</b>	Discharge 45% of the computed flow for Shark River Slough. From 1 Jun – 15 July, discharges are limited to S-12D, unless the FWS has determined that nesting for the CSSS sub-population A has ended. If S-333 is closed or discharging less than 28% of computed flow for Shark River Slough, S-12 must discharge at least 73% and up to 100% of the computed flow for Shark River Slough, if capacity is available.	See note 2 and 3 below. Discharge 55% of the computed flow for Shark River Slough when permitted by downstream conditions.	See note 3 below. Maximum allowable discharge when WCA-3B stage is below 8.5 ft-NGVD.	Closed from 1 Jun through 15 July, or until the FWS has determined that nesting for the CSSS sub-population A has ended. Otherwise, normally closed in this zone, unless water is needed for environmental reasons.
<b>Zone C</b>	Discharge 45% of the computed flow for Shark River Slough amount. If S-333 is closed or reduced in flow, S-12 can discharge up to 100% of the computed flow for Shark River Slough, if desired by ENP, subject to conditions in note 1 below.	See note 2 and 3 below. Discharge 55% of the computed flow for Shark River Slough when permitted by downstream conditions.	See note 3 below. Maximum allowable discharge when WCA-3B stage is below 8.5 ft-NGVD.	No discharges from 1 Nov – 1 Jun, unless the FWS has determined that nesting for the CSSS sub-population A has ended, then make maximum allowable discharges if no downstream problems.
<b>Zone D</b>	Discharge 45% of the computed flow for Shark River Slough. From 1 Jun – 15 July, discharges are limited to S-12D, unless the FWS has determined that nesting for the CSSS sub-population A has ended. If S-333 is closed or discharging less than 28% of computed flow for Shark River Slough, S-12 must discharge at least 73% and up to 100% of the computed flow for Shark River Slough, if capacity is available.	See note 2 and 3 below. Discharge 55% of the computed flow for Shark River Slough when permitted by downstream conditions.	See note 3 below.	Closed from 1 Jun through 15 July, or until the FWS has determined that nesting for the CSSS sub-population A has ended, S-343A&B, S-344. Otherwise, normally closed in this zone, unless water is needed for environmental reasons.
<b>Zone E</b>	Discharge 45% of the computed flow for Shark River Slough subject to note 1 below.  The L-67A Borrow Canal stage should not be drawn down below 7.5 FT-NGVD unless water is supplied from another source.	See note 2 and 3 below. Discharge 55% of the computed flow for Shark River Slough when permitted by downstream conditions.  The L-67A Borrow Canal stage should not be drawn down below 7.5 FT-NGVD unless water is supplied from another source.	See note 3 below.  The L-67A Borrow Canal stage should not be drawn down below 7.5 FT-NGVD unless water is supplied from another source.	Closed, unless water is needed for environmental reasons.  The L-67A Borrow Canal stage should not be drawn down below 7.5 FT-NGVD unless water is supplied from another source.
<b>Zone E1</b>	Discharge 45% of the computed flow for Shark River Slough. From 1 Feb – 15 July, discharges are limited to S-12D, unless the FWS has determined that nesting for the CSSS sub-population A has ended. Revert to Zone E rules if the FWS has determined that nesting for the CSSS sub-population A has ended, or if the headwater at S-333 falls below 8.25 ft-NGVD.	See note 2 and 3 below. Make maximum practicable releases at S-142, S-151, S-31, S-337, S-335, S-333, S-355A&B and S-334, subject to downstream constraints.  If the headwater at S-333 falls below 8.25 ft-NGVD, then revert to Zone E rules.		Closed during period 1 Nov through 15 July or until the FWS has determined that nesting for the CSSS sub-population A has ended. If the headwater at S-333 falls below 8.25 ft-NGVD, then revert to Zone E rules.

**Notes:**

- For the S-12 Structure in Zone A, C, E, and E1: From 1 Nov – 31 Dec, discharges are limited to S-12B, C, and/or D. From 1 Jan – 31 Jan, discharges are limited to S-12C and/or D. From 1 Feb – 15 July, discharges are limited to S-12D, unless the FWS has determined that nesting for the CSSS sub-population A has ended.
- If G-3273 is above 6.8 ft-NGVD, no discharges to Northeast Shark River Slough are permitted. However, S-333 may discharge up to maximum capacity provided that water can be discharge via S-334 to the South Dade Conveyance system subject to available capacity.
- Make water supply discharges to the East Coast and ENP-South Dade Conveyance System as needed.

Figure D3. S-333 Headwater Plotted Against Gage Site 65

S-333 Headwater vs. Site 65 (1981-1999)

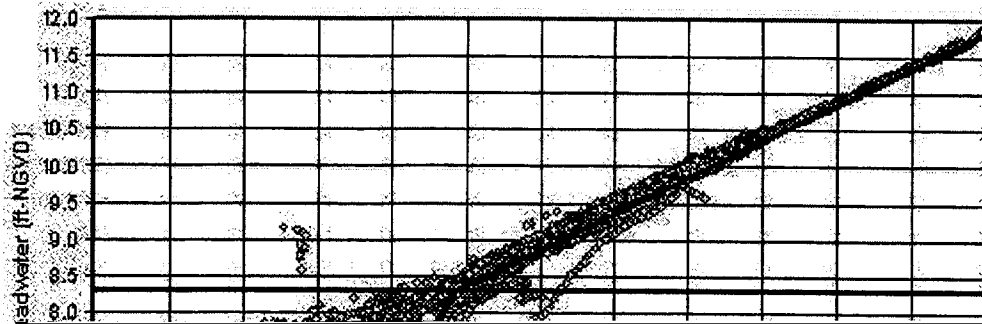




Figure D5. S-12D Headwater Plotted Against Gage Site 65

S-12D vs. Site 65 (1981-1999)

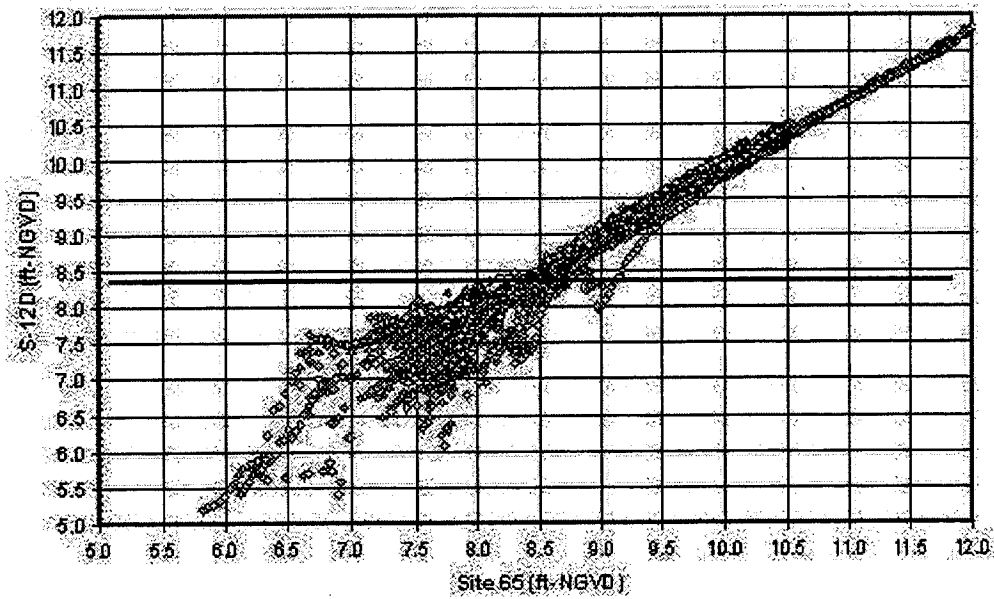
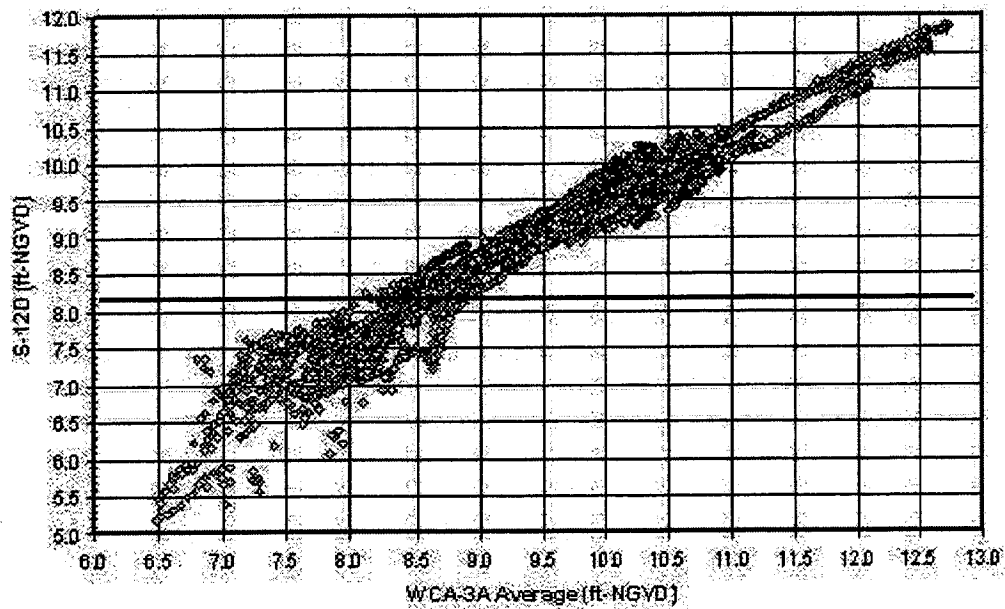
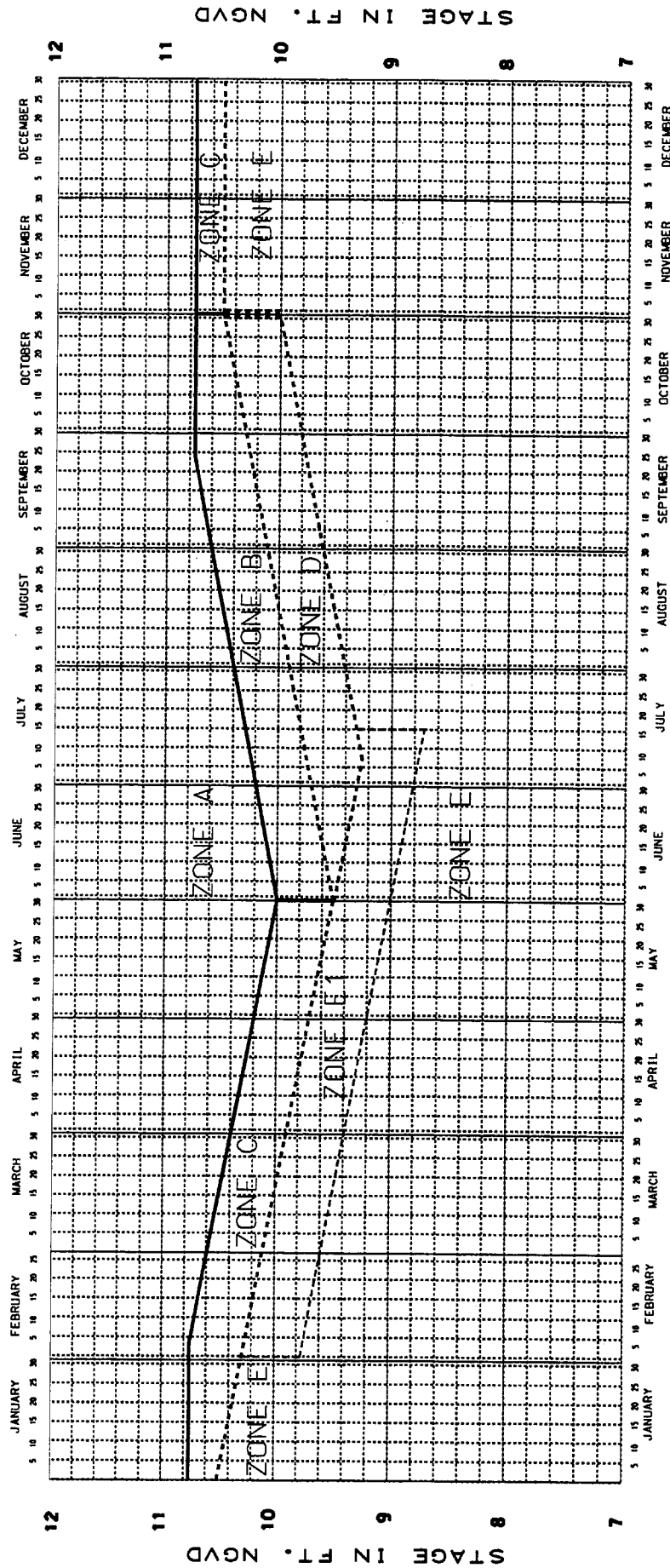


Figure D6. S-12D Headwater Plotted Against WCA-3A 3 Station Average

S-12D vs. WCA-3A Average (1981-1999)





ZONE	DESCRIPTION
A	FLOOD RELEASES
B	UPPER TRANSITION, WET SEASON
C	UPPER TRANSITION, DRY SEASON
D	LOWER TRANSITION
E	RAINFALL FORMULA

ZONE	DESCRIPTION
E1	MAKE MAXIMUM PRACTICABLE RELEASES AT S-142, S-151, S-31, S-337, S-335, S-333, S-355 A & B, AND S-334 WHEN PERMITTED BY DOWNSTREAM CONDITIONS. IF THE HEADWATER AT S-333 FALL BELOW 8.25 FT-NGVD, USE ZONE E RULES.

- NOTES: 1. ZONE INFORMATION IS DETAILED ON ATTACHED SHEET.  
 2. THE L-67A BORROW CANAL STAGE SHOULD NOT BE DRAWN DOWN BELOW 7.5 FT-NGVD UNLESS WATER IS SUPPLIED FROM ANOTHER SOURCE.

CENTRAL AND SOUTHERN FLORIDA  
 INTERIM REGULATION SCHEDULE  
 INTERIM STRUCTURAL AND OPERATIONAL  
 PLAN 2001

**WATER CONSERVATION AREA NO. 3A**  
 DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT  
 CORPS OF ENGINEERS, JACKSONVILLE, FLORIDA

Date revised: November 2000